

PATENT ABSTRACTS OF JAPAN

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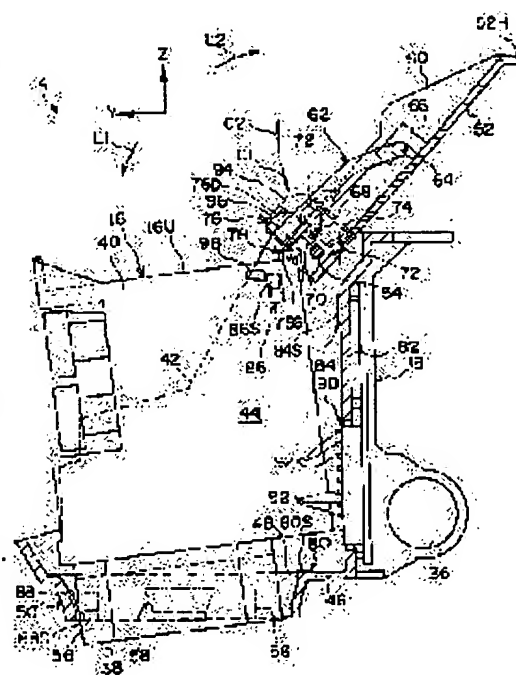
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(54) STRUCTURE FOR SECURING RECORDING HEAD UNIT, CARRIAGE UNIT, AND INK JET RECORDER

(57)Abstract:

PROBLEM TO BE SOLVED: To obtain a structure for securing an ink jet recording head while positioning easily with respect to a carriage, a carriage unit in which the ink jet recording head is secured to the carriage through that securing structure, and an ink jet recorder comprising that carriage unit.

SOLUTION: Openings 48 corresponding to respective containing sections 44 are made in the bottom wall 46 of a carriage 18 and a surrounding wall 50 is formed downward from the bottom wall 46. The surrounding wall 50 is fixed with a positioning protrusion 56 and a leaf spring 58 facing each other. An ink jet recording head 16 can be secured while being positioned accurately by simply turning a lever 52. Resiliency of the leaf spring 58 acts in the final stage of operation for securing the ink jet recording head 16.



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CLAIMS

[Claim(s)]

[Claim 1] It is the recording head unit fixed structure for fixing to the predetermined location of carriage the recording head unit which carries out the regurgitation of the ink droplet to an image recording medium based on image information. The hold section which is prepared in said carriage and holds said recording head unit, The criteria member which is prepared at least in one side of said carriage and said recording head unit, contacts another side of carriage and a recording head unit where a recording head unit is held in said hold section, and serves as a datum reference, Recording head unit fixed structure characterized by having the energization member which is prepared near said criteria member and energizes at least one side of said carriage and said recording head unit in the direction in contact with said criteria member.

[Claim 2] Recording head unit fixed structure characterized by having the holddown member which fixes a recording head unit to carriage where it was prepared in said carriage and said recording head unit is held in the predetermined location of said hold section.

[Claim 3] Recording head unit fixed structure according to claim 2 characterized by considering as the rotation member to which said holddown member is attached in rotatable to said carriage, and presses said recording head unit to hold circles by rotation actuation.

[Claim 4] Recording head unit fixed structure according to claim 3 characterized by having the engagement section which engages with a recording head unit after it was prepared in the rotation member and said recording head unit has reached the predetermined location of said hold section by this rotation member.

[Claim 5] Carriage equipment characterized by having the carriage equipped with the hold section which can hold a recording head unit, and the recording head unit which is fixed to said hold section by recording head unit fixed structure according to claim 1 to 4, and carries out the regurgitation of the ink droplet to an image recording medium based on image information.

[Claim 6] The ink jet recording device characterized by having carriage equipment according to claim 5.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the carriage equipment with which the recording head unit was fixed to carriage by the recording head unit fixed structure for fixing to the predetermined location of carriage in more detail the recording head unit which carries out the

regurgitation of the ink droplet to an image recording medium based on image information about recording head unit fixed structure, carriage equipment, and an ink jet recording device, and this recording head unit fixed structure, and the ink jet recording device equipped with this carriage equipment.

[0002]

[Description of the Prior Art] While carrying an ink jet recording head in the ink jet recording apparatus which breathes out an ink droplet from an ink jet recording head to a record medium according to image information, and performs image recording, there are many things equipped with the carriage which moves in the fixed direction (main scanning direction). It is necessary to position an ink jet recording head to accuracy to carriage, and to fix in such an ink jet recording apparatus. In the ink jet recording apparatus (for example, thing which breathes out black (Bk), cyanogen (C), a Magenta (M), and the ink droplet of yellow (Y), and records a full color image) which carries out the regurgitation of the ink droplet of a color which is different from two or more ink jet recording heads especially, if each ink jet recording head is positioned to accuracy to the predetermined location of carriage and it does not fix, the so-called color gap will occur and image quality will be spoiled.

[0003] Moreover, recently, in order to raise the so-called throughput (image recording capacity per unit time amount), the proposal of raising acceleration until it raises the scan speed of the main scanning direction of an ink jet recording head or reaches a stationary rate is made. Since bigger force (an inertia force, oscillation produced in an ink jet recording apparatus) acts on an ink jet recording head, it will be necessary to fix an ink jet recording head to carriage firmly, and to prevent a location gap by these.

[0004] For example, the spring members 118 and 120 are attached in side attachment walls 114 and 116 by the carriage 112 (refer to publication-number No. 244230 [eight to] official report) shown in drawing 13 and drawing 14 . If a pen (unit of an ink jet recording head) is held in the hold sections 122 and 124, alignment to the direction of X of a pen will be carried out because these spring members 118 and 120 push a pen toward the datum 128 prepared in the main wall 126.

[0005] However, since the spring members 118 and 120 are attached in the upper part of side attachment walls 114 and 116, when holding a pen in the hold sections 122 and 124, the elastic force from the spring members 118 and 120 will act by the initial stage of hold actuation.

[0006]

[Problem(s) to be Solved by the Invention] This invention makes it a technical problem to obtain the carriage equipment with which the ink jet recording head was fixed to carriage by the ink jet recording head fixed structure which positions an ink jet recording head easily to carriage, and can be fixed, and this ink jet recording head fixed structure, and the ink jet recording device equipped with this carriage equipment in consideration of the above-mentioned data.

[0007]

[Means for Solving the Problem] It is the recording head unit fixed structure for fixing to the predetermined location of carriage the recording head unit which carries out the regurgitation of the ink droplet to an image recording medium based on image information in invention according to claim 1. The hold section which is prepared in said carriage and holds said recording head unit, The criteria member which is prepared at least in one side of said carriage and said recording head unit, contacts another side of carriage and a recording head unit where a recording head unit is held in said hold section, and serves as a datum reference, It is prepared near said criteria member and characterized by having the energization member which energizes

at least one side of said carriage and said recording head unit in the direction in contact with said criteria member.

[0008] Where a recording head unit is held in the hold section prepared in carriage, the criteria member prepared in one side of carriage and a recording head unit contacts another side of carriage and a recording head unit, and a recording head unit is positioned to carriage in a predetermined location. Here, for positioning, where a recording head unit is thoroughly held in the hold section of carriage, if a criteria member contacts another side of carriage and a recording head unit, it is enough, and in the condition in the middle of hold, it can prepare in a location which does not contact.

[0009] Moreover, where a recording head unit is held in the hold section, an energization member energizes at least one side of said recording head unit in the direction in contact with said criteria member. Since this contacts a criteria member certainly, a recording head unit can be positioned more to accuracy to carriage. Moreover, it is fixable to carriage by pinching a recording head unit by the energization member and the criteria member.

[0010] The energization member is prepared near the criteria member. Therefore, the energization force of an energization member can be considered as the location which acts only in the culmination of operation which holds a recording head unit in the hold section, and is not made to act in the other phase. For this reason, it becomes easy, and to carriage, the actuation which holds a recording head unit in the predetermined location of the carriage hold section positions easily, and can be fixed. Since a recording head unit can be easily held to the hold section of carriage even if it enlarges the energization force of an energization member especially, it becomes possible to use the big energization member of the energization force and to fix a recording head unit to carriage firmly.

[0011] In addition, in this invention, that it should just be the location which a recording head unit contacts an energization member in the culmination of operation which holds a recording head unit in the hold section, and receives the energization force "near the criteria member", to the criteria member, an energization member adjoins and does not need to be strictly prepared from this viewpoint.

[0012] In invention according to claim 2, in invention according to claim 1, it is prepared in said carriage and characterized by having the holddown member which fixes a recording head unit to carriage where said recording head unit is held in the predetermined location of said hold section.

[0013] By the holddown member, since a recording head unit is fixable to carriage in a predetermined location, the location gap and omission over carriage of a recording head unit can be prevented certainly.

[0014] In invention according to claim 3, it is characterized by considering as the rotation member to which said holddown member is attached in rotatable to said carriage, and presses said recording head unit to hold circles by rotation actuation in invention according to claim 2.

[0015] Therefore, a recording head unit can be pressed to hold circles, and can be made to hold by easy actuation of rotating a rotation member.

[0016] In invention according to claim 4, in invention according to claim 3, it is prepared in a rotation member and characterized by having the engagement section which engages with a recording head unit after said recording head unit has reached the predetermined location of said hold section by this rotation member.

[0017] When a recording head unit reaches the predetermined location of the hold section, it engages with a recording head unit, and the location gap of a rotation member and the recording head unit is carried out carelessly, or the engagement section prepared in the rotation member

stops namely, estranging. For this reason, a recording head unit is more certainly fixed in the predetermined location of carriage.

[0018] In invention according to claim 5, it is characterized by having the carriage equipped with the hold section which can hold a recording head unit, and the recording head unit which is fixed to said hold section by recording head unit fixed structure according to claim 1 to 4, and carries out the regurgitation of the ink droplet to an image recording medium based on image information.

[0019] That is, carriage equipment consists of that a recording head unit is fixed to the hold section of carriage. In the ink jet recording apparatus equipped with this carriage equipment, an image is recorded for an ink droplet on discharge and a record medium from a recording head unit, moving carriage equipment to a main scanning direction.

[0020] Since it is being fixed to carriage by recording head unit fixed structure according to claim 1 to 4, a recording head unit is fixed firmly in an exact location. For this reason, a location gap of a recording head unit does not occur, but the high-definition image which always does not have a color gap etc. can be recorded.

[0021] Moreover, the activity which holds a recording head unit in the hold section of carriage, and is fixed to a predetermined location also becomes easy.

[0022] In invention according to claim 6, it is characterized by having carriage equipment according to claim 5.

[0023] In this ink jet recording apparatus, it has carriage equipment according to claim 5, and the recording head unit is being firmly fixed to carriage in the exact location. Therefore, a location gap of a recording head unit does not occur, but the high-definition image which always does not have a color gap etc. can be recorded.

[0024]

[Embodiment of the Invention] The ink jet recording device 12 concerning 1 operation gestalt of this invention is shown in drawing 1. Moreover, the carriage equipment 14 constituted from the ink jet recording head 16 being fixed to carriage 18 by the recording head unit fixed structure of 1 operation gestalt of this invention is shown in drawing 2 - drawing 11. In addition, although drawing 2 - drawing 6 show for convenience the condition of a graphic display of not being loaded with some ink jet recording heads 16 to carriage 18, it is loaded with all the ink jet recording heads 16 in the actual operating condition of carriage equipment 14.

[0025] As for the ink jet recording device 12, the record-medium cassette 20 is formed in the lower part so that drawing 1 may show. While record media 22 (for example, a record form, an OHP sheet, etc.) are held in the state of a laminating, the pickup roller 24 for taking out a record medium 22 is formed in the record-medium cassette 20.

[0026] Moreover, in the ink jet recording apparatus 12, the advice plate 28 which shows a record medium 22 to the Records Department 26 (lower part location of the ink jet recording head 16), the conveyance roller 30 which conveys a record medium 22, and the platen 32 are formed. It is conveyed with the conveyance roller 30 at the Records Department 26 on a platen 32, the record medium 22 in the record-medium cassette 20 being picked out from the record-medium cassette 20, and being further guided with a pickup roller 24, at the advice plate 28.

[0027] The ink jet recording device 12 is built over the shaft 34 so that it may intersect perpendicularly with the conveyance direction (drawing 1 the direction of arrow-head Y, left) of the record medium 22 in the Records Department 26. The shaft 34 is inserted in the insertion hole 36 of carriage 18, and moves carriage 18 along with the insertion hole 36 (horizontal scanning). Therefore, at the Records Department 26, an image is recorded on a record medium

22 because the conveyance roller 30 conveys a record medium 22 only in the specified quantity whenever it carries out horizontal scanning and one more horizontal scanning is completed, the ink jet recording head 16 breathing out an ink droplet according to image information (vertical scanning). In the following explanation, toward drawing 2 of a main scanning direction - drawing 6 , the direction of plus (+) X is distinguished for the right sense, and it distinguishes the direction of plus (+) Y, and above for the direction of vertical scanning as a plus (+) Z direction.

[0028] As shown in drawing 2 - drawing 6 , carriage 18 is loaded with four ink jet recording heads 16 with this operation gestalt. constituting every ink jet recording head 16, so that the regurgitation of black (Bk), cyanogen (C), a Magenta (M), and the ink droplet of each color of yellow (Y) may be carried out -- ***** -- a full color image is recordable.

[0029] The ink jet recording head 16 has the head section 38 which carries out the regurgitation of the ink droplet to a record medium 22, and the subink tank section 40 in which the ink breathed out from this head section 38 was stored beforehand. If the ink of the subink tank section 40 decreases in number below to the specified quantity, ink will be supplied from a Maine ink tank (all are graphic display abbreviations) by ink makeup equipment.

[0030] The four hold sections 44 corresponding to four ink jet recording heads 16 are constituted by carriage 18 with the wall 42 (side-attachment-wall 42S and bridgewall 42D). The opening 48 corresponding to each of the head section 38 is formed, it turns to the bottom wall 46 of carriage 18 caudad from the bottom wall 46 around opening 48 further, and the envelopment wall 50 is formed in it. If the predetermined location of the hold section 44 is loaded with the ink jet recording head 16 as shown in drawing 9 and drawing 10 , the head section 38 projects caudad from opening 48. The projecting head section 38 is surrounded with the envelopment wall 50.

[0031] The lever 52 corresponding to each of the four hold sections 44 is formed in the upper part of carriage 18. Each lever 52 is independently made rotatable the core [a shaft 54], and a user can grasp grasping section 52H and can rotate a shaft 54 now.

[0032] As shown in drawing 5 - drawing 11 , the locating lug 56 which projects toward the inside of the hold section 44 (in namely, the direction of +X) is formed in the envelopment wall 50. The apical surface of each locating lug 56 is set to datum-plane 56S, contacts the side face of the head section 38 of the ink jet recording head 16 with which the predetermined location was loaded, and positions the ink jet recording head 16 to a main scanning direction. Furthermore, slideway 56G which incline aslant are formed above datum-plane 56S, when loaded with the ink jet recording head 16, side-face 16S of the ink jet recording head 16 are contacted, and the ink jet recording head 16 is guided in the direction of +X.

[0033] Moreover, flat spring 58 is positioned and it is attached in the location which counters each locating lug 56. In the state of installation, flat spring 58 is supported in the shape of a cantilever so that it may go to a slanting lower part, and it is located near the locating lug 56. For this reason, when holding the ink jet recording head 16 in the hold section 44, the ink jet recording head 16 contacts flat spring 58 in the culmination of hold actuation.

[0034] On the other hand, as shown in each of a lever 52 at drawing 2 - drawing 5 and drawing 7 - drawing 11 , a side attachment wall 60 is formed and the cam 62 is arranged among these side attachment walls 60. The shank material 64 formed in the end of a cam 62 is held in the bearing material 66 formed in the opposed face of a side attachment wall 60, and a cam 62 is rotatable considering the shank material 64 as a core so that drawing 7 - drawing 11 may show.

[0035] Moreover, the limit heights 68 are formed in the other end of a cam 62. The limit heights 68 are located in the limit rib 70 formed in the side attachment wall 60 of a lever 52, and the rotation range of a cam 62 is restricted within fixed limits (location shown in drawing 7)

because the limit heights 68 hit the limit rib 70.

[0036] The hold crevice 72 is formed in the opposed face of a lever 52 and a cam 62, and the helical compression spring 74 is held in this hold crevice 72. The helical compression spring 74 is energizing the cam 62 in the direction (arrow-head C 2-way) estranged from a lever 52, and rotation of the carrier beam lever 52 is restricted to the fixed range by contact to the limit heights 68 and the limit rib 70 as mentioned above in this energization force.

[0037] In addition, let the location of a helical compression spring 74 be a position in consideration of relation with the location of a shaft 54 etc. so that it is most lengthened when a lever 52 becomes the medium (location shown in drawing 9) of the rotation range (therefore, it will be in an unstable condition), and these rotation may be energized by the elastic force of a helical compression spring 74, if a lever 52 is rotated even when it is smaller than this to arrow-head L1 direction or an arrow-head L 2-way.

[0038] The projection 76 is formed in the base (field of a lever 52 and the objection which counters) of a cam 62. Moreover, the projection 78 corresponding to projection 76 is formed in top-face 16U (top face of the subink tank section 40) of the ink jet recording head 16. If a lever 52 is rotated in the arrow-head L1 direction in the condition (not pushed in up to a predetermined location only condition only carried aslant) of having set the ink jet recording head 16 in the hold section 44 as shown in drawing 7, as shown in drawing 8, projection 76 will contact top-face 16U of the ink jet recording head 16. Here, if the elastic force of a helical compression spring 74 is resisted and a lever 52 is rotated further, the ink jet recording head 16 will be pressed caudad, projection 76 sliding on top-face 16U of the ink jet recording head 16, and as shown in drawing 10 from drawing 9, the ink jet recording head 16 will reach the predetermined location in the hold section 44.

[0039] Positioning inclined plane 76D which inclined in the three directions of the direction of +X (main scanning direction), the direction (the direction of vertical scanning) of -Y, and -Z direction (down) is formed in the projection 76 of a cam 62. On the other hand, where the ink jet recording head 16 is held in the predetermined location in the hold section 44, criteria inclined plane 78S which carry out field contact are formed in the projection 78 of the ink jet recording head 16 at positioning inclined plane 76D.

[0040] As shown in drawing 10, when the ink jet recording head 16 reaches the predetermined location in the hold section 44, in order that positioning inclined plane 76D and criteria inclined plane 78S may contact, the elastic force of a helical compression spring 74 acts from positioning inclined plane 76D to criteria inclined plane 78S, and presses the ink jet recording head 16 to the direction of +X, the direction of -Y, and -Z direction.

[0041] As shown in drawing 7 - drawing 11, the criteria projection 80 which goes up (+Z direction) is formed in the bottom wall 46 of carriage 18 every hold section 44, and the top face is set to datum-level 80S. Moreover, the criteria projection 84 which goes to the front (the direction of +Y) is formed also in the posterior wall of stomach 82 of carriage 18 every hold section 44, and the front face is set to datum-level 84S. In addition, the criteria projection 86 which projects to the side (the direction of -X) is formed in the side face of the subink tank section 40, and the head is set to datum-level 86S.

[0042] For this reason, when the ink jet recording head 16 is pressed in response to the elastic force of a helical compression spring 74 to the direction of +X, the direction of -Y, and -Z direction, the base of the subink tank section 40 contacts datum-plane 80S of the criteria projection 80, and it is fixed while the ink jet recording head 16 is positioned in the vertical direction. Moreover, the rear face of the subink tank section 40 contacts datum-plane 84S of the

criteria projection 84, and it is fixed while the ink jet recording head 16 is positioned in the direction of vertical scanning. Furthermore, it is fixed, while datum-level 86S of the criteria projection 86 of the subink tank section 40 contact a wall 42 and are positioned in a main scanning direction.

[0043] In addition, the criteria projection 88 is formed in the front wall of the envelopment wall 50, and the rear face is set to datum-level 88S. Moreover, the connector 90 for connecting a harness electrically to the ink jet recording head 16 with which it was loaded is formed in the posterior wall of stomach 82 of carriage 18. If it connects with the ink jet recording head 16, the pin 92 of a connector 90 has predetermined elasticity so that the ink jet recording head 16 may be energized in the direction of +Y. It is fixed, while the carrier beam ink jet recording head 16 contacts datum-level 88S and is positioned in this elastic force.

[0044] As shown in drawing 2 - drawing 4 and drawing 7 - drawing 11 , one side of the side attachment wall 60 of a lever 52 is extended caudad, an extension 94 is formed, and the engagement projection 96 is further formed in the extension 94. On the other hand, the engagement projection 98 corresponding to the engagement projection 96 is formed also in the side face of the ink jet recording head 16.

[0045] If the taper sides 96T and 98T and the engagement sides 96F and 98F are formed in the engagement projection 96 and the engagement projection 98, respectively and a lever 52 is rotated in the arrow-head L1 direction as shown in a detail at drawing 12 , as a two-dot chain line shows to drawing 12 (B), taper side 96T and 98T will contact. Here, since an extension 94 will bend elastically as a continuous line shows to drawing 12 (B) if a lever 52 is further pushed in the arrow-head L1 direction, it becomes rotatable about a lever 52 further. And if a lever 52 becomes an abbreviation horizontal, as shown in drawing 12 (C), the engagement projection 96 will enter to the back of the engagement projection 98, an extension 94 will revert elastically, and the engagement sides 96F and 98F will be engaged. In this condition, even if it is going to rotate a lever 52 to an arrow-head L 2-way, in order that engagement side 96F may contact engagement side 98F, it becomes rotational resistance. If this is resisted and a lever 52 is rotated to an arrow-head L 2-way, the ink jet recording head 16 will receive the force to the slanting upper part by engagement of the engagement sides 96F and 98F. And as shown in drawing 11 , from the predetermined location in the hold section 44, the near location of datum-level 88S is rotated as an abbreviation rotation core, and a user pushes out easily to the location in which ejection is possible.

[0046] Next, an operation of carriage equipment 14 and the ink jet recording device 12 is explained to be the approach of loading carriage 18 with the ink jet recording head 16 in this operation gestalt.

[0047] When loading carriage 18 with the ink jet recording head 16, as shown in drawing 7 , where it made the arrow-head L 2-way rotate a lever 52 and the upper part of the hold section 44 is opened, the ink jet recording head 16 corresponding to the hold section 44 is placed first. What is necessary is just not to push the ink jet recording head 16 to the predetermined location in the hold section 44, and to carry and put on extent from which the ink jet recording head 16 becomes slanting at this time, so that drawing 7 may show.

[0048] Next, a lever 52 is rotated in the arrow-head L1 direction. As shown in drawing 8 , the projection 76 of a cam 62 contacts top-face 16U of the ink jet recording head 16, and projection 76 presses the ink jet recording head 16 below, sliding on top-face 16U. Although resistance arises in rotation in order for taper side 96T of the engagement projections 96 and 98 and 98T to contact as it is in the middle of rotation and is shown in drawing 12 (B), a lever 52 can be rotated

pressing the ink jet recording head 16 to the predetermined location of the hold section 44 further, as shown in drawing 9, since the side attachment wall 60 (extension 94) of a lever 52 bends.

[0049] If a lever 52 becomes an abbreviation horizontal as shown in drawing 10, positioning inclined plane 76D formed in the projection 76 of a cam 62 and criteria inclined plane 78D formed in the projection 78 of the ink jet recording head 16 will carry out field contact, and the elastic force of a helical compression spring 74 will act to the direction of +X, the direction of -Y, and -Z direction. Moreover, the base of the subink tank section 40 contacts datum-plane 80S of the criteria projection 80, the rear face of the subink tank section 40 contacts datum-plane 84S of the criteria projection 84, respectively, and datum-plane 86S of the criteria projection 86 of the side face of the subink tank section 40 contact a wall 42 further. The ink jet recording head 16 is positioned and fixed in any direction of a main scanning direction, the direction of vertical scanning, and the vertical direction by these at accuracy.

[0050] Moreover, when the pin 92 of a connector 90 is connected to the ink jet recording head 16, the ink jet recording head 16 contacts datum-level 88S, and is positioned and fixed in the direction of vertical scanning by the elastic force from a pin 92.

[0051] Furthermore, since flat spring 58 contacts and presses from the side in the head section 38 of the ink jet recording head 16, the head section 38 contacts a locating lug 56, and the ink jet recording head 16 is positioned also in the lower part in a main scanning direction. After the ink jet recording head 16 has been positioned by the predetermined location in the hold section 44 by these at accuracy, it will be fixed firmly.

[0052] And in the culmination of the actuation which positions the ink jet recording head 16 on carriage 16, and is fixed, since the elastic force of flat spring 58 acts, a loading activity becomes easy.

[0053] Moreover, after the lever 52 has become an abbreviation horizontal, since the engagement sides 96F and 98F of the engagement projections 96 and 98 are engaged as shown in drawing 12 (C), the lever 52 of rotating to an arrow-head L 2-way is lost carelessly. Furthermore, in this condition, the lever 52 is energized in the arrow-head L1 direction in response to the elastic force of a helical compression spring 74. The unprepared rotation to the arrow-head L 2-way of a lever 52 is restricted by this.

[0054] Thus, by easy actuation (only rotate a lever 52 substantially), the ink jet recording head 16 can be positioned to accuracy, it can fix to carriage 18, and the carriage equipment 14 of this invention can be constituted. Since the ink jet recording head 16 of each color will be positioned by accuracy in the predetermined location when recording an image on a record medium 22 using the ink jet recording head 16 in which carriage equipment 14 was carried, as shown in drawing 1, the so-called color gap etc. does not occur but a high-definition image can be recorded. Moreover, even when raising the passing speed of carriage 18 for the so-called improvement in a throughput etc. or raising acceleration since it is firmly fixed to carriage 18 for example, the ink jet recording head 16 does not carry out the location gap of each ink jet recording head 16 carelessly to carriage 18.

[0055] It may be necessary to exchange the ink jet recording head 16 by the activity of the ink jet recording apparatus 12. In this case, if an arrow-head L 2-way is made to rotate the lever 52 corresponding to the ink jet recording head 16 to exchange, by engagement of the engagement sides 96F and 98F, the ink jet recording head 16 receives the force to the slanting upper part, from the predetermined location in the hold section 44, the near location of datum-level 88S will be rotated as an abbreviation rotation core, and a user will push out easily to the location in

which ejection is possible. Therefore, the ink jet recording head 16 which should be exchanged can be taken out easily, and exchange becomes easy.

[0056] Moreover, a lever 52 is formed every four ink jet recording heads 16, and can be rotated independently, respectively. For this reason, if only the lever 52 is rotated to an arrow-head L 2-way when exchanging the ink jet recording head 16 located, for example in the main scanning direction medium, since only the ink jet recording head 16 which should be exchanged projects in the slanting upper part from other ink jet recording heads 16, even if it is exchange of the middle ink jet recording head 16, it can carry out easily. Although there is a thing of a configuration of the ink jet recording head 16 being miniaturized, or sticking mutually and being arranged in recent years especially, even if it is such a configuration, the specific ink jet recording head 16 can be taken out easily. Of course, exchange of the ink jet recording head 16 to which the ink jet recording head 16 is located in the medium by not only four configurations but three or at least five configurations or more becomes easy.

[0057] In addition, although the ink jet recording head 16 mentioned as an example the configuration thing which has the head section 38 and the subink tank section 40, it is not necessary to have the subink tank section 40, and may be constituted from the above-mentioned explanation by only the head section 38 as an ink jet recording head 16.

[0058]

[Effect of the Invention] In this invention, since it considered as the above-mentioned configuration, an ink jet recording head is easily positioned to carriage, and it can fix.

TECHNICAL FIELD

[Field of the Invention] This invention relates to the carriage equipment with which the recording head unit was fixed to carriage by the recording head unit fixed structure for fixing to the predetermined location of carriage in more detail the recording head unit which carries out the regurgitation of the ink droplet to an image recording medium based on image information about recording head unit fixed structure, carriage equipment, and an ink jet recording device, and this recording head unit fixed structure, and the ink jet recording device equipped with this carriage equipment.

PRIOR ART

[Description of the Prior Art] While carrying an ink jet recording head in the ink jet recording apparatus which breathes out an ink droplet from an ink jet recording head to a record medium according to image information, and performs image recording, there are many things equipped with the carriage which moves in the fixed direction (main scanning direction). It is necessary to position an ink jet recording head to accuracy to carriage, and to fix in such an ink jet recording apparatus. In the ink jet recording apparatus (for example, thing which breathes out black (Bk), cyanogen (C), a Magenta (M), and the ink droplet of yellow (Y), and records a full color image) which carries out the regurgitation of the ink droplet of a color which is different from two or more ink jet recording heads especially, if each ink jet recording head is positioned to accuracy to the predetermined location of carriage and it does not fix, the so-called color gap will occur and image quality will be spoiled.

[0003] Moreover, recently, in order to raise the so-called throughput (image recording capacity per unit time amount), the proposal of raising acceleration until it raises the scan speed of the

main scanning direction of an ink jet recording head or reaches a stationary rate is made. Since bigger force (an inertia force, oscillation produced in an ink jet recording apparatus) acts on an ink jet recording head, it will be necessary to fix an ink jet recording head to carriage firmly, and to prevent a location gap by these.

[0004] For example, the spring members 118 and 120 are attached in side attachment walls 114 and 116 by the carriage 112 (refer to publication-number No. 244230 [eight to] official report) shown in drawing 13 and drawing 14 . If a pen (unit of an ink jet recording head) is held in the hold sections 122 and 124, alignment to the direction of X of a pen will be carried out because these spring members 118 and 120 push a pen toward the datum 128 prepared in the main wall 126.

[0005] However, since the spring members 118 and 120 are attached in the upper part of side attachment walls 114 and 116, when holding a pen in the hold sections 122 and 124, the elastic force from the spring members 118 and 120 will act by the initial stage of hold actuation.

EFFECT OF THE INVENTION

[Effect of the Invention] In this invention, since it considered as the above-mentioned configuration, an ink jet recording head is easily positioned to carriage, and it can fix.

TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] This invention makes it a technical problem to obtain the carriage equipment with which the ink jet recording head was fixed to carriage by the ink jet recording head fixed structure which positions an ink jet recording head easily to carriage, and can be fixed, and this ink jet recording head fixed structure, and the ink jet recording device equipped with this carriage equipment in consideration of the above-mentioned data.

MEANS

[Means for Solving the Problem] It is the recording head unit fixed structure for fixing to the predetermined location of carriage the recording head unit which carries out the regurgitation of the ink droplet to an image recording medium based on image information in invention according to claim 1. The hold section which is prepared in said carriage and holds said recording head unit, The criteria member which is prepared at least in one side of said carriage and said recording head unit, contacts another side of carriage and a recording head unit where a recording head unit is held in said hold section, and serves as a datum reference, It is prepared near said criteria member and characterized by having the energization member which energizes at least one side of said carriage and said recording head unit in the direction in contact with said criteria member.

[0008] Where a recording head unit is held in the hold section prepared in carriage, the criteria member prepared in one side of carriage and a recording head unit contacts another side of carriage and a recording head unit, and a recording head unit is positioned to carriage in a predetermined location. Here, for positioning, where a recording head unit is thoroughly held in the hold section of carriage, if a criteria member contacts another side of carriage and a recording head unit, it is enough, and in the condition in the middle of hold, it can prepare in a location which does not contact.

[0009] Moreover, where a recording head unit is held in the hold section, an energization member energizes at least one side of said recording head unit in the direction in contact with said criteria member. Since this contacts a criteria member certainly, a recording head unit can be positioned more to accuracy to carriage. Moreover, it is fixable to carriage by pinching a recording head unit by the energization member and the criteria member.

[0010] The energization member is prepared near the criteria member. Therefore, the energization force of an energization member can be considered as the location which acts only in the culmination of operation which holds a recording head unit in the hold section, and is not made to act in the other phase. For this reason, it becomes easy, and to carriage, the actuation which holds a recording head unit in the predetermined location of the carriage hold section positions easily, and can be fixed. Since a recording head unit can be easily held to the hold section of carriage even if it enlarges the energization force of an energization member especially, it becomes possible to use the big energization member of the energization force and to fix a recording head unit to carriage firmly.

[0011] In addition, in this invention, that it should just be the location which a recording head unit contacts an energization member in the culmination of operation which holds a recording head unit in the hold section, and receives the energization force "near the criteria member", to the criteria member, an energization member adjoins and does not need to be strictly prepared from this viewpoint.

[0012] In invention according to claim 2, in invention according to claim 1, it is prepared in said carriage and characterized by having the holddown member which fixes a recording head unit to carriage where said recording head unit is held in the predetermined location of said hold section.

[0013] By the holddown member, since a recording head unit is fixable to carriage in a predetermined location, the location gap and omission over carriage of a recording head unit can be prevented certainly.

[0014] In invention according to claim 3, it is characterized by considering as the rotation member to which said holddown member is attached in rotatable to said carriage, and presses said recording head unit to hold circles by rotation actuation in invention according to claim 2.

[0015] Therefore, a recording head unit can be pressed to hold circles, and can be made to hold by easy actuation of rotating a rotation member.

[0016] In invention according to claim 4, in invention according to claim 3, it is prepared in a rotation member and characterized by having the engagement section which engages with a recording head unit after said recording head unit has reached the predetermined location of said hold section by this rotation member.

[0017] When a recording head unit reaches the predetermined location of the hold section, it engages with a recording head unit, and the location gap of a rotation member and the recording head unit is carried out carelessly, or the engagement section prepared in the rotation member stops namely, estranging. For this reason, a recording head unit is more certainly fixed in the predetermined location of carriage.

[0018] In invention according to claim 5, it is characterized by having the carriage equipped with the hold section which can hold a recording head unit, and the recording head unit which is fixed to said hold section by recording head unit fixed structure according to claim 1 to 4, and carries out the regurgitation of the ink droplet to an image recording medium based on image information.

[0019] That is, carriage equipment consists of that a recording head unit is fixed to the hold section of carriage. In the ink jet recording apparatus equipped with this carriage equipment, an

image is recorded for an ink droplet on discharge and a record medium from a recording head unit, moving carriage equipment to a main scanning direction.

[0020] Since it is being fixed to carriage by recording head unit fixed structure according to claim 1 to 4, a recording head unit is fixed firmly in an exact location. For this reason, a location gap of a recording head unit does not occur, but the high-definition image which always does not have a color gap etc. can be recorded.

[0021] Moreover, the activity which holds a recording head unit in the hold section of carriage, and is fixed to a predetermined location also becomes easy.

[0022] In invention according to claim 6, it is characterized by having carriage equipment according to claim 5.

[0023] In this ink jet recording apparatus, it has carriage equipment according to claim 5, and the recording head unit is being firmly fixed to carriage in the exact location. Therefore, a location gap of a recording head unit does not occur, but the high-definition image which always does not have a color gap etc. can be recorded.

[0024]

[Embodiment of the Invention] The ink jet recording device 12 concerning 1 operation gestalt of this invention is shown in drawing 1. Moreover, the carriage equipment 14 constituted from the ink jet recording head 16 being fixed to carriage 18 by the recording head unit fixed structure of 1 operation gestalt of this invention is shown in drawing 2 - drawing 11. In addition, although drawing 2 - drawing 6 show for convenience the condition of a graphic display of not being loaded with some ink jet recording heads 16 to carriage 18, it is loaded with all the ink jet recording heads 16 in the actual operating condition of carriage equipment 14.

[0025] As for the ink jet recording device 12, the record-medium cassette 20 is formed in the lower part so that drawing 1 may show. While record media 22 (for example, a record form, an OHP sheet, etc.) are held in the state of a laminating, the pickup roller 24 for taking out a record medium 22 is formed in the record-medium cassette 20.

[0026] Moreover, in the ink jet recording apparatus 12, the advice plate 28 which shows a record medium 22 to the Records Department 26 (lower part location of the ink jet recording head 16), the conveyance roller 30 which conveys a record medium 22, and the platen 32 are formed. It is conveyed with the conveyance roller 30 at the Records Department 26 on a platen 32, the record medium 22 in the record-medium cassette 20 being picked out from the record-medium cassette 20, and being further guided with a pickup roller 24, at the advice plate 28.

[0027] The ink jet recording device 12 is built over the shaft 34 so that it may intersect perpendicularly with the conveyance direction (drawing 1 the direction of arrow-head Y, left) of the record medium 22 in the Records Department 26. The shaft 34 is inserted in the insertion hole 36 of carriage 18, and moves carriage 18 along with the insertion hole 36 (horizontal scanning). Therefore, at the Records Department 26, an image is recorded on a record medium 22 because the conveyance roller 30 conveys a record medium 22 only in the specified quantity whenever it carries out horizontal scanning and one more horizontal scanning is completed, the ink jet recording head 16 breathing out an ink droplet according to image information (vertical scanning). In the following explanation, toward drawing 2 of a main scanning direction - drawing 6, the direction of plus (+) X is distinguished for the right sense, and it distinguishes the direction of plus (+) Y, and above for the direction of vertical scanning as a plus (+) Z direction.

[0028] As shown in drawing 2 - drawing 6, carriage 18 is loaded with four ink jet recording heads 16 with this operation gestalt. constituting every ink jet recording head 16, so that the regurgitation of black (Bk), cyanogen (C), a Magenta (M), and the ink droplet of each color of

yellow (Y) may be carried out -- ***** -- a full color image is recordable.

[0029] The ink jet recording head 16 has the head section 38 which carries out the regurgitation of the ink droplet to a record medium 22, and the subink tank section 40 in which the ink breathed out from this head section 38 was stored beforehand. If the ink of the subink tank section 40 decreases in number below to the specified quantity, ink will be supplied from a Maine ink tank (all are graphic display abbreviations) by ink makeup equipment.

[0030] The four hold sections 44 corresponding to four ink jet recording heads 16 are constituted by carriage 18 with the wall 42 (side-attachment-wall 42S and bridgewall 42D). The opening 48 corresponding to each of the head section 38 is formed, it turns to the bottom wall 46 of carriage 18 caudad from the bottom wall 46 around opening 48 further, and the envelopment wall 50 is formed in it. If the predetermined location of the hold section 44 is loaded with the ink jet recording head 16 as shown in drawing 9 and drawing 10, the head section 38 projects caudad from opening 48. The projecting head section 38 is surrounded with the envelopment wall 50.

[0031] The lever 52 corresponding to each of the four hold sections 44 is formed in the upper part of carriage 18. Each lever 52 is independently made rotatable the core [a shaft 54], and a user can grasp grasping section 52H and can rotate a shaft 54 now.

[0032] As shown in drawing 5 - drawing 11, the locating lug 56 which projects toward the inside of the hold section 44 (in namely, the direction of +X) is formed in the envelopment wall 50. The apical surface of each locating lug 56 is set to datum-plane 56S, contacts the side face of the head section 38 of the ink jet recording head 16 with which the predetermined location was loaded, and positions the ink jet recording head 16 to a main scanning direction. Furthermore, slideway 56G which incline aslant are formed above datum-plane 56S, when loaded with the ink jet recording head 16, side-face 16S of the ink jet recording head 16 are contacted, and the ink jet recording head 16 is guided in the direction of +X.

[0033] Moreover, flat spring 58 is positioned and it is attached in the location which counters each locating lug 56. In the state of installation, flat spring 58 is supported in the shape of a cantilever so that it may go to a slanting lower part, and it is located near the locating lug 56. For this reason, when holding the ink jet recording head 16 in the hold section 44, the ink jet recording head 16 contacts flat spring 58 in the culmination of hold actuation.

[0034] On the other hand, as shown in each of a lever 52 at drawing 2 - drawing 5 and drawing 7 - drawing 11, a side attachment wall 60 is formed and the cam 62 is arranged among these side attachment walls 60. The shank material 64 formed in the end of a cam 62 is held in the bearing material 66 formed in the opposed face of a side attachment wall 60, and a cam 62 is rotatable considering the shank material 64 as a core so that drawing 7 - drawing 11 may show.

[0035] Moreover, the limit heights 68 are formed in the other end of a cam 62. The limit heights 68 are located in the limit rib 70 formed in the side attachment wall 60 of a lever 52, and the rotation range of a cam 62 is restricted within fixed limits (location shown in drawing 7) because the limit heights 68 hit the limit rib 70.

[0036] The hold crevice 72 is formed in the opposed face of a lever 52 and a cam 62, and the helical compression spring 74 is held in this hold crevice 72. The helical compression spring 74 is energizing the cam 62 in the direction (arrow-head C 2-way) estranged from a lever 52, and rotation of the carrier beam lever 52 is restricted to the fixed range by contact to the limit heights 68 and the limit rib 70 as mentioned above in this energization force.

[0037] In addition, let the location of a helical compression spring 74 be a position in consideration of relation with the location of a shaft 54 etc. so that it is most lengthened when a lever 52 becomes the medium (location shown in drawing 9) of the rotation range (therefore, it

will be in an unstable condition), and these rotation may be energized by the elastic force of a helical compression spring 74, if a lever 52 is rotated even when it is smaller than this to arrow-head L1 direction or an arrow-head L 2-way.

[0038] The projection 76 is formed in the base (field of a lever 52 and the objection which counters) of a cam 62. Moreover, the projection 78 corresponding to projection 76 is formed in top-face 16U (top face of the subink tank section 40) of the ink jet recording head 16. If a lever 52 is rotated in the arrow-head L1 direction in the condition (not pushed in up to a predetermined location only condition only carried aslant) of having set the ink jet recording head 16 in the hold section 44 as shown in drawing 7 , as shown in drawing 8 , projection 76 will contact top-face 16U of the ink jet recording head 16. Here, if the elastic force of a helical compression spring 74 is resisted and a lever 52 is rotated further, the ink jet recording head 16 will be pressed caudad, projection 76 sliding on top-face 16U of the ink jet recording head 16, and as shown in drawing 10 from drawing 9 , the ink jet recording head 16 will reach the predetermined location in the hold section 44.

[0039] Positioning inclined plane 76D which inclined in the three directions of the direction of +X (main scanning direction), the direction (the direction of vertical scanning) of -Y, and - Z direction (down) is formed in the projection 76 of a cam 62. On the other hand, where the ink jet recording head 16 is held in the predetermined location in the hold section 44, criteria inclined plane 78S which carry out field contact are formed in the projection 78 of the ink jet recording head 16 at positioning inclined plane 76D.

[0040] As shown in drawing 10 , when the ink jet recording head 16 reaches the predetermined location in the hold section 44, in order that positioning inclined plane 76D and criteria inclined plane 78S may contact, the elastic force of a helical compression spring 74 acts from positioning inclined plane 76D to criteria inclined plane 78S, and presses the ink jet recording head 16 to the direction of +X, the direction of -Y, and - Z direction.

[0041] As shown in drawing 7 - drawing 11 , the criteria projection 80 which goes up (+ Z direction) is formed in the bottom wall 46 of carriage 18 every hold section 44, and the top face is set to datum-level 80S. Moreover, the criteria projection 84 which goes to the front (the direction of +Y) is formed also in the posterior wall of stomach 82 of carriage 18 every hold section 44, and the front face is set to datum-level 84S. In addition, the criteria projection 86 which projects to the side (the direction of -X) is formed in the side face of the subink tank section 40, and the head is set to datum-level 86S.

[0042] For this reason, when the ink jet recording head 16 is pressed in response to the elastic force of a helical compression spring 74 to the direction of +X, the direction of -Y, and - Z direction, the base of the subink tank section 40 contacts datum-plane 80S of the criteria projection 80, and it is fixed while the ink jet recording head 16 is positioned in the vertical direction. Moreover, the rear face of the subink tank section 40 contacts datum-plane 84S of the criteria projection 84, and it is fixed while the ink jet recording head 16 is positioned in the direction of vertical scanning. Furthermore, it is fixed, while datum-level 86S of the criteria projection 86 of the subink tank section 40 contact a wall 42 and are positioned in a main scanning direction.

[0043] In addition, the criteria projection 88 is formed in the front wall of the envelopment wall 50, and the rear face is set to datum-level 88S. Moreover, the connector 90 for connecting a harness electrically to the ink jet recording head 16 with which it was loaded is formed in the posterior wall of stomach 82 of carriage 18. If it connects with the ink jet recording head 16, the pin 92 of a connector 90 has predetermined elasticity so that the ink jet recording head 16 may be

energized in the direction of +Y. It is fixed, while the carrier beam ink jet recording head 16 contacts datum-level 88S and is positioned in this elastic force.

[0044] As shown in drawing 2 - drawing 4 and drawing 7 - drawing 11, one side of the side attachment wall 60 of a lever 52 is extended caudad, an extension 94 is formed, and the engagement projection 96 is further formed in the extension 94. On the other hand, the engagement projection 98 corresponding to the engagement projection 96 is formed also in the side face of the ink jet recording head 16.

[0045] If the taper sides 96T and 98T and the engagement sides 96F and 98F are formed in the engagement projection 96 and the engagement projection 98, respectively and a lever 52 is rotated in the arrow-head L1 direction as shown in a detail at drawing 12, as a two-dot chain line shows to drawing 12 (B), taper side 96T and 98T will contact. Here, since an extension 94 will bend elastically as a continuous line shows to drawing 12 (B) if a lever 52 is further pushed in the arrow-head L1 direction, it becomes rotatable about a lever 52 further. And if a lever 52 becomes an abbreviation horizontal, as shown in drawing 12 (C), the engagement projection 96 will enter to the back of the engagement projection 98, an extension 94 will revert elastically, and the engagement sides 96F and 98F will be engaged. In this condition, even if it is going to rotate a lever 52 to an arrow-head L 2-way, in order that engagement side 96F may contact engagement side 98F, it becomes rotational resistance. If this is resisted and a lever 52 is rotated to an arrow-head L 2-way, the ink jet recording head 16 will receive the force to the slanting upper part by engagement of the engagement sides 96F and 98F. And as shown in drawing 11, from the predetermined location in the hold section 44, the near location of datum-level 88S is rotated as an abbreviation rotation core, and a user pushes out easily to the location in which ejection is possible.

[0046] Next, an operation of carriage equipment 14 and the ink jet recording device 12 is explained to be the approach of loading carriage 18 with the ink jet recording head 16 in this operation gestalt.

[0047] When loading carriage 18 with the ink jet recording head 16, as shown in drawing 7, where it made the arrow-head L 2-way rotate a lever 52 and the upper part of the hold section 44 is opened, the ink jet recording head 16 corresponding to the hold section 44 is placed first. What is necessary is just not to push the ink jet recording head 16 to the predetermined location in the hold section 44, and to carry and put on extent from which the ink jet recording head 16 becomes slanting at this time, so that drawing 7 may show.

[0048] Next, a lever 52 is rotated in the arrow-head L1 direction. As shown in drawing 8, the projection 76 of a cam 62 contacts top-face 16U of the ink jet recording head 16, and projection 76 presses the ink jet recording head 16 below, sliding on top-face 16U. Although resistance arises in rotation in order for taper side 96T of the engagement projections 96 and 98 and 98T to contact as it is in the middle of rotation and is shown in drawing 12 (B), a lever 52 can be rotated pressing the ink jet recording head 16 to the predetermined location of the hold section 44 further, as shown in drawing 9, since the side attachment wall 60 (extension 94) of a lever 52 bends.

[0049] If a lever 52 becomes an abbreviation horizontal as shown in drawing 10, positioning inclined plane 76D formed in the projection 76 of a cam 62 and criteria inclined plane 78D formed in the projection 78 of the ink jet recording head 16 will carry out field contact, and the elastic force of a helical compression spring 74 will act to the direction of +X, the direction of -Y, and -Z direction. Moreover, the base of the subink tank section 40 contacts datum-plane 80S of the criteria projection 80, the rear face of the subink tank section 40 contacts datum-plane 84S

of the criteria projection 84, respectively, and datum-plane 86S of the criteria projection 86 of the side face of the subink tank section 40 contact a wall 42 further. The ink jet recording head 16 is positioned and fixed in any direction of a main scanning direction, the direction of vertical scanning, and the vertical direction by these at accuracy.

[0050] Moreover, when the pin 92 of a connector 90 is connected to the ink jet recording head 16, the ink jet recording head 16 contacts datum-level 88S, and is positioned and fixed in the direction of vertical scanning by the elastic force from a pin 92.

[0051] Furthermore, since flat spring 58 contacts and presses from the side in the head section 38 of the ink jet recording head 16, the head section 38 contacts a locating lug 56, and the ink jet recording head 16 is positioned also in the lower part in a main scanning direction. After the ink jet recording head 16 has been positioned by the predetermined location in the hold section 44 by these at accuracy, it will be fixed firmly.

[0052] And in the culmination of the actuation which positions the ink jet recording head 16 on carriage 16, and is fixed, since the elastic force of flat spring 58 acts, a loading activity becomes easy.

[0053] Moreover, after the lever 52 has become an abbreviation horizontal, since the engagement sides 96F and 98F of the engagement projections 96 and 98 are engaged as shown in drawing 12 (C), the lever 52 of rotating to an arrow-head L 2-way is lost carelessly. Furthermore, in this condition, the lever 52 is energized in the arrow-head L1 direction in response to the elastic force of a helical compression spring 74. The unprepared rotation to the arrow-head L 2-way of a lever 52 is restricted by this.

[0054] Thus, by easy actuation (only rotate a lever 52 substantially), the ink jet recording head 16 can be positioned to accuracy, it can fix to carriage 18, and the carriage equipment 14 of this invention can be constituted. Since the ink jet recording head 16 of each color will be positioned by accuracy in the predetermined location when recording an image on a record medium 22 using the ink jet recording head 16 in which carriage equipment 14 was carried, as shown in drawing 1, the so-called color gap etc. does not occur but a high-definition image can be recorded. Moreover, even when raising the passing speed of carriage 18 for the so-called improvement in a throughput etc. or raising acceleration since it is firmly fixed to carriage 18 for example, the ink jet recording head 16 does not carry out the location gap of each ink jet recording head 16 carelessly to carriage 18.

[0055] It may be necessary to exchange the ink jet recording head 16 by the activity of the ink jet recording apparatus 12. In this case, if an arrow-head L 2-way is made to rotate the lever 52 corresponding to the ink jet recording head 16 to exchange, by engagement of the engagement sides 96F and 98F, the ink jet recording head 16 receives the force to the slanting upper part, from the predetermined location in the hold section 44, the near location of datum-level 88S will be rotated as an abbreviation rotation core, and a user will push out easily to the location in which ejection is possible. Therefore, the ink jet recording head 16 which should be exchanged can be taken out easily, and exchange becomes easy.

[0056] Moreover, a lever 52 is formed every four ink jet recording heads 16, and can be rotated independently, respectively. For this reason, if only the lever 52 is rotated to an arrow-head L 2-way when exchanging the ink jet recording head 16 located, for example in the main scanning direction medium, since only the ink jet recording head 16 which should be exchanged projects in the slanting upper part from other ink jet recording heads 16, even if it is exchange of the middle ink jet recording head 16, it can carry out easily. Although there is a thing of a configuration of the ink jet recording head 16 being miniaturized, or sticking mutually and being

arranged in recent years especially, even if it is such a configuration, the specific ink jet recording head 16 can be taken out easily. Of course, exchange of the ink jet recording head 16 to which the ink jet recording head 16 is located in the medium by not only four configurations but three or at least five configurations or more becomes easy.

[0057] In addition, although the ink jet recording head 16 mentioned as an example the configuration thing which has the head section 38 and the subink tank section 40, it is not necessary to have the subink tank section 40, and may be constituted from the above-mentioned explanation by only the head section 38 as an ink jet recording head 16.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the side elevation showing the outline configuration of the ink jet recording device of 1 operation gestalt of this invention.

[Drawing 2] It is the perspective view showing some ink jet recording heads where the carriage equipment of 1 operation gestalt of this invention is taken out from carriage.

[Drawing 3] It is the perspective view showing some ink jet recording heads where the carriage equipment of 1 operation gestalt of this invention is taken out from carriage.

[Drawing 4] It is the perspective view showing some ink jet recording heads where the carriage equipment of 1 operation gestalt of this invention is taken out from carriage.

[Drawing 5] It is the perspective view showing some ink jet recording heads where the carriage equipment of 1 operation gestalt of this invention is taken out from carriage.

[Drawing 6] It is the top view showing some ink jet recording heads where the carriage equipment of 1 operation gestalt of this invention is taken out from carriage.

[Drawing 7] the condition of loading carriage with an ink jet recording head in the carriage equipment of 1 operation gestalt of this invention is shown -- it is a fracture side elevation a part.

[Drawing 8] the condition of loading carriage with an ink jet recording head in the carriage equipment of 1 operation gestalt of this invention is shown -- it is a fracture side elevation a part.

[Drawing 9] the condition of loading carriage with an ink jet recording head in the carriage equipment of 1 operation gestalt of this invention is shown -- it is a fracture side elevation a part.

[Drawing 10] the condition of having loaded carriage with the ink jet recording head in the carriage equipment of 1 operation gestalt of this invention is shown -- it is a fracture side elevation a part.

[Drawing 11] the condition of taking out an ink jet recording head from carriage in the carriage equipment of 1 operation gestalt of this invention is shown -- it is a fracture side elevation a part.

[Drawing 12] It is the explanatory view showing in order the condition that engagement projections are engaged in the carriage equipment of 1 operation gestalt of this invention, from (A) to (C).

[Drawing 13] It is the perspective view showing the conventional carriage.

[Drawing 14] It is the perspective view showing the conventional carriage.

[Description of Notations]

12 Ink Jet Recording Device

14 Carriage Equipment

16 Ink Jet Recording Head (Recording Head Unit)

18 Carriage

44 Hold Section

52 Lever (Rotation Member, Holddown Member)
56 Locating Lug (Criteria Member)
58 Flat Spring (Energization Member)
62 Cam (Rotation Member, Holddown Member)
80 Criteria Projection (Criteria Member)
84 Criteria Projection (Criteria Member)
86 Criteria Projection (Criteria Member)
88 Criteria Projection (Criteria Member)
92 Pin (Energization Member)
96 Engagement Projection (Engagement Section)

[Translation done.]

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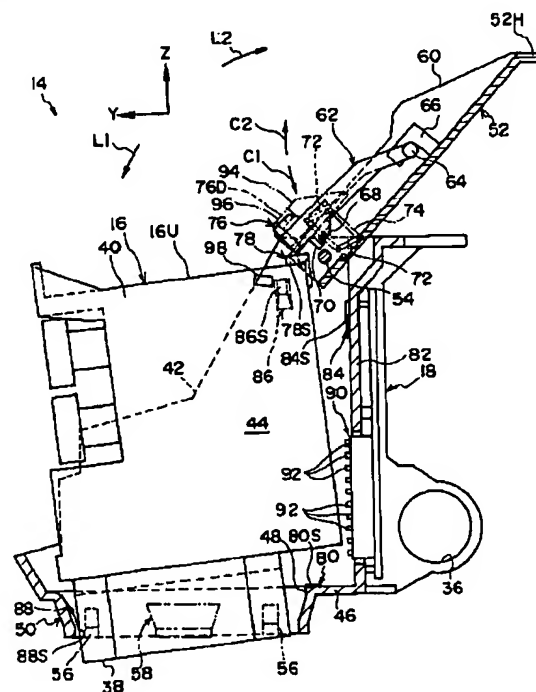
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(54) 【発明の名称】 記録ヘッドユニット固定構造、キャリッジ装置及びインクジェット記録装置

(57) 【要約】

【課題】 インクジェット記録ヘッドをキャリッジに対して容易に位置決めして固定できるインクジェット記録ヘッド固定構造と、このインクジェット記録ヘッド固定構造によってキャリッジにインクジェット記録ヘッドが固定されたキャリッジ装置、及びこのキャリッジ装置を備えたインクジェット記録装置を得る。

【解決手段】 キャリッジ18の底壁46には、收容部44のそれぞれに対応する開口48が形成され、底壁46から下方に向けて包囲壁50が形成される。包囲壁50には、位置決め突起56と板ばね58が対向するように取り付けられている。レバー52を回動させるだけで、インクジェット記録ヘッドインクジェット記録ヘッド16を正確に位置決めして固定できる。インクジェット記録ヘッド16を固定する動作の最終段階で、板ばね58の弾性力が作用する。



【特許請求の範囲】

【請求項1】 画像情報に基づいてインク滴を画像記録媒体に吐出する記録ヘッドユニットをキャリッジの所定位置に固定するための記録ヘッドユニット固定構造であって、

前記キャリッジに設けられ前記記録ヘッドユニットを収容する収容部と、

前記キャリッジと前記記録ヘッドユニットの少なくとも一方に設けられ、前記収容部に記録ヘッドユニットが収容された状態でキャリッジと記録ヘッドユニットの他方に接触して位置基準となる基準部材と、

前記基準部材の近傍に設けられ前記キャリッジと前記記録ヘッドユニットの少なくとも一方を前記基準部材に接触する方向へ付勢する付勢部材と、

を有することを特徴とする記録ヘッドユニット固定構造。

【請求項2】 前記キャリッジに設けられ、前記記録ヘッドユニットが前記収容部の所定位置に収容された状態で記録ヘッドユニットをキャリッジに対して固定する固定部材、

を有することを特徴とする記録ヘッドユニット固定構造。

【請求項3】 前記固定部材が、前記キャリッジに対して回動可能に取り付けられ回動動作により前記記録ヘッドユニットを収容部内へと押圧する回動部材、とされていることを特徴とする請求項2に記載の記録ヘッドユニット固定構造。

【請求項4】 回動部材に設けられ、この回動部材によって前記記録ヘッドユニットが前記収容部の所定位置に至った状態で記録ヘッドユニットと係合する係合部、を有することを特徴とする請求項3に記載の記録ヘッドユニット固定構造。

【請求項5】 記録ヘッドユニットを収容可能な収容部を備えたキャリッジと、

前記収容部に請求項1～請求項4のいずれかに記載の記録ヘッドユニット固定構造によって固定され、画像情報に基づいてインク滴を画像記録媒体に吐出する記録ヘッドユニットと、

を有することを特徴とするキャリッジ装置。

【請求項6】 請求項5に記載のキャリッジ装置を有することを特徴とするインクジェット記録装置。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】 本発明は、記録ヘッドユニット固定構造、キャリッジ装置及びインクジェット記録装置に関し、さらに詳しくは、画像情報に基づいてインク滴を画像記録媒体に吐出する記録ヘッドユニットをキャリッジの所定位置に固定するための記録ヘッドユニット固定構造と、この記録ヘッドユニット固定構造によってキャリッジに記録ヘッドユニットが固定されたキャリッ

ジ装置、及びこのキャリッジ装置を備えたインクジェット記録装置に関する。

【0002】

【従来の技術】 画像情報に応じてインクジェット記録ヘッドからインク滴を記録媒体に吐出して画像記録を行うインクジェット記録装置では、インクジェット記録ヘッドを搭載すると共に、一定方向（主走査方向）へと移動するキャリッジを備えたものが多い。このようなインクジェット記録装置では、インクジェット記録ヘッドをキャリッジに対して正確に位置決めして固定する必要がある。特に、複数のインクジェット記録ヘッドから異なる色のインク滴を吐出するインクジェット記録装置（例えば、ブラック（Bk）、シアン（C）、マゼンタ（M）及びイエロー（Y）のインク滴を吐出してフルカラーの画像を記録するもの）等では、それぞれのインクジェット記録ヘッドをキャリッジの所定位置へ正確に位置決めして固定しないと、いわゆる色ずれが発生し、画質を損なってしまうことになる。

【0003】 また、最近では、いわゆるスループット（単位時間当たりの画像記録能力）を向上させるために、インクジェット記録ヘッドの主走査方向の走査速度を向上させたり、定常速度に達するまでの加速度を向上させたりする等の提案がされている。これらにより、インクジェット記録ヘッドには、より大きな力（慣性力や、インクジェット記録装置に生じる振動等）が作用するため、インクジェット記録ヘッドをキャリッジに強固に固定し、位置ずれを防止する必要がある。

【0004】 例えば、図13及び図14に示すキャリッジ112（特開平8-244230号公報参照）では、側壁114、116にばね部材118、120が取り付けられている。ペン（インクジェット記録ヘッドのユニット）が収容部122、124に収容されると、これらのばね部材118、120が、主壁126に設けられたデータム128に向かってペンを押すことで、ペンのX方向への位置合わせがされるようになっている。

【0005】 しかし、ばね部材118、120は側壁114、116の上部に取り付けられているので、ペンを収容部122、124に収容するときに収容動作の初期段階でばね部材118、120からの弾性力が作用してしまう。

【0006】

【発明が解決しようとする課題】 本発明は、上記事実を考慮し、インクジェット記録ヘッドをキャリッジに対して容易に位置決めして固定できるインクジェット記録ヘッド固定構造と、このインクジェット記録ヘッド固定構造によってキャリッジにインクジェット記録ヘッドが固定されたキャリッジ装置、及びこのキャリッジ装置を備えたインクジェット記録装置を得ることを課題とする。

【0007】

【課題を解決するための手段】 請求項1に記載の発明で

は、画像情報に基づいてインク滴を画像記録媒体に吐出する記録ヘッドユニットをキャリッジの所定位置に固定するための記録ヘッドユニット固定構造であって、前記キャリッジに設けられ前記記録ヘッドユニットを収容する収容部と、前記キャリッジと前記記録ヘッドユニットの少なくとも一方に設けられ、前記収容部に記録ヘッドユニットが収容された状態でキャリッジと記録ヘッドユニットの他方に接触して位置基準となる基準部材と、前記基準部材の近傍に設けられ前記キャリッジと前記記録ヘッドユニットの少なくとも一方を前記基準部材に接触する方向へ付勢する付勢部材と、を有することを特徴とする。

【0008】キャリッジに設けられた収容部に記録ヘッドユニットを収容した状態で、キャリッジと記録ヘッドユニットの一方に設けられた基準部材が、キャリッジと記録ヘッドユニットの他方に接触し、記録ヘッドユニットがキャリッジに対して所定位置に位置決めされる。ここで、位置決めのためには、キャリッジの収容部に記録ヘッドユニットが完全に収容された状態で、基準部材がキャリッジと記録ヘッドユニットの他方に接触すれば十分であり、収容途中の状態では接触しないような位置に設けることができる。

【0009】また、記録ヘッドユニットが収容部に収容された状態で、付勢部材が、前記記録ヘッドユニットの少なくとも一方を前記基準部材に接触する方向へ付勢する。これにより、基準部材に確実に接触するので、記録ヘッドユニットをキャリッジに対して、より正確に位置決めできる。また、記録ヘッドユニットを付勢部材と基準部材とで挟持することで、キャリッジに対して固定することができる。

【0010】付勢部材は、基準部材の近傍に設けられている。従って、付勢部材の付勢力は、記録ヘッドユニットを収容部に収容する動作の最終段階でのみ作用し、それ以外の段階では作用させない位置とすることが可能である。このため、記録ヘッドユニットをキャリッジ収容部の所定位置に収容する動作が容易になり、キャリッジに対して容易に位置決めして固定できる。特に、付勢部材の付勢力を大きくしても、記録ヘッドユニットをキャリッジの収容部に対して容易に収容できるので、付勢力の大きな付勢部材を使用して、記録ヘッドユニットをキャリッジに強固に固定することが可能になる。

【0011】なお、本発明において「基準部材の近傍」とは、記録ヘッドユニットを収容部に収容する動作の最終段階で記録ヘッドユニットが付勢部材に接触して付勢力を受けるような位置であればよく、かかる観点からは、厳密に付勢部材が基準部材に対して隣接して設けられていなくてもよい。

【0012】請求項2に記載の発明では、請求項1に記載の発明において、前記キャリッジに設けられ、前記記録ヘッドユニットが前記収容部の所定位置に収容された

状態で記録ヘッドユニットをキャリッジに対して固定する固定部材、を有することを特徴とする。

【0013】固定部材により、記録ヘッドユニットをキャリッジに対して所定位置で固定できるので、記録ヘッドユニットのキャリッジに対する位置ずれや脱落を確実に防止できる。

【0014】請求項3に記載の発明では、請求項2に記載の発明において、前記固定部材が、前記キャリッジに対して回動可能に取り付けられ回動動作により前記記録ヘッドユニットを収容部内へと押圧する回動部材、とされていることを特徴とする。

【0015】従って、回動部材を回動させるだけの簡単な操作で、記録ヘッドユニットを収容部内へと押圧して収容させることができる。

【0016】請求項4に記載の発明では、請求項3に記載の発明において、回動部材に設けられ、この回動部材によって前記記録ヘッドユニットが前記収容部の所定位置に至った状態で記録ヘッドユニットと係合する係合部、を有することを特徴とする。

【0017】すなわち、記録ヘッドユニットが収容部の所定位置に至ると、回動部材に設けられた係合部が記録ヘッドユニットと係合し、回動部材と記録ヘッドユニットとは不用意に位置ずれしたり離間したりしなくなる。このため、記録ヘッドユニットがキャリッジの所定位置で、より確実に固定される。

【0018】請求項5に記載の発明では、記録ヘッドユニットを収容可能な収容部を備えたキャリッジと、前記収容部に請求項1～請求項4のいずれかに記載の記録ヘッドユニット固定構造によって固定され、画像情報に基づいてインク滴を画像記録媒体に吐出する記録ヘッドユニットと、を有することを特徴とする。

【0019】すなわち、キャリッジの収容部に記録ヘッドユニットが固定されることで、キャリッジ装置が構成される。このキャリッジ装置を備えたインクジェット記録装置では、キャリッジ装置を主走査方向に移動させながら、記録ヘッドユニットからインク滴を吐出し、記録媒体に画像を記録する。

【0020】記録ヘッドユニットは、請求項1～請求項4のいずれかに記載の記録ヘッドユニット固定構造によってキャリッジに固定されているので、正確な位置で強固に固定される。このため、記録ヘッドユニットの位置ずれが発生せず、常に色ずれなどのない高画質の画像を記録することができる。

【0021】また、記録ヘッドユニットをキャリッジの収容部に収容して所定位置に固定する作業も容易となる。

【0022】請求項6に記載の発明では、請求項5に記載のキャリッジ装置を有することを特徴とする。

【0023】このインクジェット記録装置では、請求項5に記載のキャリッジ装置を有しており、記録ヘッドユ

ニットが正確な位置で強固にキャリッジに固定されている。従って、記録ヘッドユニットの位置ずれが発生せず、常に色ずれなどのない高画質の画像を記録することができる。

【0024】

【発明の実施の形態】図1には、本発明の一実施形態に係るインクジェット記録装置12が示されている。また、図2～図11には、本発明の一実施形態の記録ヘッドユニット固定構造によって、インクジェット記録ヘッド16がキャリッジ18に固定されることで構成されたキャリッジ装置14が示されている。なお、図2～図6では、図示の便宜上、キャリッジ18に対して一部のインクジェット記録ヘッド16が装填されていない状態を示しているが、キャリッジ装置14の実際の使用状況では、すべてのインクジェット記録ヘッド16が装填される。

【0025】図1から分かるように、インクジェット記録装置12は、その下部に記録媒体カセット20が設けられている。記録媒体カセット20には、記録媒体22（例えば記録用紙やOHPシート等）が積層状態で収容されると共に、記録媒体22を取り出すためのピックアップローラ24が設けられている。

【0026】また、インクジェット記録装置12内には、記録媒体22を記録部26（インクジェット記録ヘッド16の下方位置）へと案内する案内プレート28と、記録媒体22を搬送する搬送ローラ30、及びブラテン32が設けられている。記録媒体カセット20内の記録媒体22は、ピックアップローラ24によって記録媒体カセット20から取り出され、さらに案内プレート28に案内されつつ、搬送ローラ30によってブラテン32上の記録部26へと搬送される。

【0027】インクジェット記録装置12には、記録部26での記録媒体22の搬送方向（矢印Y方向、図1では左方向）と直交するように、シャフト34が掛け渡されている。シャフト34は、キャリッジ18の挿通孔36に挿通されており、キャリッジ18は挿通孔36に沿って移動（主走査）する。従って、記録部26において、インクジェット記録ヘッド16が画像情報に応じてインク滴を吐出しつつ主走査し、さらに1回の主走査が終了すると搬送ローラ30が記録媒体22を所定量だけ搬送（副走査）することで、記録媒体22上に画像が記録される。以下の説明では、主走査方向の図2～図6に向かって右向きをプラス（+）X方向、副走査方向をプラス（+）Y方向、上方向をプラス（+）Z方向として区別する。

【0028】図2～図6に示すように、本実施形態では、キャリッジ18に4つのインクジェット記録ヘッド16が装填されるようになっている。インクジェット記録ヘッド16ごとに、例えば、ブラック（Bk）、シアン（C）、マゼンタ（M）及びイエロー（Y）の各色の

インク滴を吐出するように構成することで、いわゆるフルカラーの画像を記録することができる。

【0029】インクジェット記録ヘッド16は、記録媒体22にインク滴を吐出するヘッド部38と、このヘッド部38から吐出されるインクが予め貯留されたサブインクタンク部40と、を有している。サブインクタンク部40のインクが所定量以下に減少すると、インク補給装置によってメインインクタンク（いずれも図示省略）からインクが補給される。

【0030】キャリッジ18には、壁42（側壁42S及び仕切り壁42D）によって、4つのインクジェット記録ヘッド16に対応した4つの収容部44が構成されている。キャリッジ18の底壁46には、ヘッド部38のそれぞれに対応する開口48が形成され、さらに開口48の周囲の底壁46から下方に向けて、包囲壁50が形成されている。図9及び図10に示すように、インクジェット記録ヘッド16が収容部44の所定位置に装填されると、ヘッド部38が開口48から下方に突出する。突出したヘッド部38は、包囲壁50によって包囲される。

【0031】キャリッジ18の上部には、4つの収容部44のそれぞれに対応するレバー52が設けられている。それぞれのレバー52は、シャフト54を中心として、独立して回動可能とされており、ユーザーが把持部52Hを把持してシャフト54を回動させることができるようになっている。

【0032】図5～図11に示すように、包囲壁50には、収容部44内に向かって（すなわち+X方向に）突出する位置決め突起56が形成されている。それぞれの位置決め突起56の先端面は基準面56Sとされており、所定位置に装填されたインクジェット記録ヘッド16のヘッド部38の側面に接触して、インクジェット記録ヘッド16を主走査方向に位置決めする。さらに、基準面56Sの上方には斜めに傾斜する案内面56Gが形成されており、インクジェット記録ヘッド16が装填されるときにインクジェット記録ヘッド16の側面16Sに接触して、インクジェット記録ヘッド16を+X方向へと案内するようになっている。

【0033】また、それぞれの位置決め突起56に対向する位置には、板ばね58が位置決めされて取り付けられている。板ばね58は、取り付け状態では、斜め下方に向かうように片持ち状に支持され、位置決め突起56の近傍に位置している。このため、収容部44にインクジェット記録ヘッド16を収容するときには、収容動作の最終段階で、インクジェット記録ヘッド16が板ばね58に接触する。

【0034】一方、レバー52のそれぞれには、図2～図5及び図7～図11に示すように、側壁60が形成され、これら側壁60の間に、カム62が配設されている。図7～図11から分かるように、カム62の一端に

形成された軸部材64が、側壁60の対向面に形成された軸受部材66に収容されており、カム62は軸部材64を中心として回動可能となっている。

【0035】また、カム62の他端には、制限凸部68が形成されている。制限凸部68は、レバー52の側壁60に形成された制限リブ70内に位置しており、カム62の回動範囲を、制限凸部68が制限リブ70に当たることによって一定範囲内（図7に示す位置）に制限している。

【0036】レバー52及びカム62の対向面には、収容凹部72が形成されており、この収容凹部72に、圧縮コイルばね74が収容されている。圧縮コイルばね74は、カム62をレバー52から離間する方向（矢印C2方向）へと付勢しており、この付勢力を受けたレバー52の回動が、前述のように制限凸部68と制限リブ70との接触により一定範囲に制限される。

【0037】なお、圧縮コイルばね74の位置は、レバー52が回動範囲の中間（図9に示す位置）となったときに最も伸ばされ（従って不安定な状態となる）、これよりも矢印L1方向又は矢印L2方向にわずかもレバー52を回動させると、圧縮コイルばね74の弾性力によってこれらの回動が付勢されるように、シャフト54の位置等との関係を考慮して、所定の位置とされている。

【0038】カム62の底面（レバー52と対向する反対の面）には、突起76が形成されている。また、インクジェット記録ヘッド16の上面16U（サブインクタンク部40の上面）には、突起76に対応する突起78が形成されている。図7に示すように、インクジェット記録ヘッド16を収容部44内にセットした状態（所定位置までは押し込まれておらず、単に斜めに載せられているだけの状態）においてレバー52を矢印L1方向に回動させると、図8に示すように、突起76がインクジェット記録ヘッド16の上面16Uに接触する。ここで、圧縮コイルばね74の弾性力に抗してさらにレバー52を回動させると、突起76がインクジェット記録ヘッド16の上面16Uを摺動しつつインクジェット記録ヘッド16を下方に押圧し、図9から図10に示すように、インクジェット記録ヘッド16は収容部44内の所定位置に至るようになっていく。

【0039】カム62の突起76には、+X方向（主走査方向）、-Y方向（副走査方向）及び-Z方向（下方）の3方向に傾斜した位置決め傾斜面76Dが形成されている。これに対し、インクジェット記録ヘッド16の突起78には、インクジェット記録ヘッド16が収容部44内の所定位置に収容された状態で、位置決め傾斜面76Dに面接触する基準傾斜面78Sが形成されている。

【0040】図10に示すようにインクジェット記録ヘッド16が収容部44内の所定位置に至ったとき、位置

決め傾斜面76Dと基準傾斜面78Sとが接触するため、圧縮コイルばね74の弾性力が、位置決め傾斜面76Dから基準傾斜面78Sへと作用し、インクジェット記録ヘッド16を、+X方向、-Y方向及び-Z方向へと押圧する。

【0041】図7～図11に示すように、キャリッジ18の底壁46には、それぞれの収容部44ごとに、上方（+Z方向）に向かう基準突起80が形成され、その上面が基準面80Sとされている。また、キャリッジ18の後壁82にも、それぞれの収容部44ごとに、前方（+Y方向）へ向かう基準突起84が形成され、その前面が基準面84Sとされている。加えて、サブインクタンク部40の側面には、側方（-X方向）へと突出する基準突起86が形成され、その先端が基準面86Sとされている。

【0042】このため、圧縮コイルばね74の弾性力を受けてインクジェット記録ヘッド16が+X方向、-Y方向及び-Z方向へと押圧されると、サブインクタンク部40の底面が基準突起80の基準面80Sに接触して、インクジェット記録ヘッド16が上下方向に位置決めされると共に固定される。また、サブインクタンク部40の後面が基準突起84の基準面84Sに接触して、インクジェット記録ヘッド16が副走査方向に位置決めされると共に固定される。さらに、サブインクタンク部40の基準突起86の基準面86Sが壁42に接触して、主走査方向に位置決めされると共に固定される。

【0043】加えて、包囲壁50の前壁には基準突起88が形成され、その後面は基準面88Sとされている。また、キャリッジ18の後壁82には、装填されたインクジェット記録ヘッド16に対しハーネスを電気的に接続するためのコネクタ90が設けられている。コネクタ90のピン92は、インクジェット記録ヘッド16に接続されると、インクジェット記録ヘッド16を+Y方向へと付勢するように、所定の弾性を有している。この弾性力を受けたインクジェット記録ヘッド16が、基準面88Sに接触して位置決めされると共に固定される。

【0044】図2～図4及び図7～図11に示すように、レバー52の側壁60の一方は下方に延長されて延長部94が形成され、さらに延長部94に、係合突起96が形成されている。一方、インクジェット記録ヘッド16の側面にも、係合突起96に対応する係合突起98が形成されている。

【0045】図12に詳細に示すように、係合突起96及び係合突起98にはそれぞれテーパ面96T、98Tと、係合面96F、98Fが形成されており、レバー52を矢印L1方向に回動させると、図12（B）に二点鎖線で示すように、テーパ面96T、98Tどうしが接触する。ここで、レバー52を矢印L1方向にさらに押すと、図12（B）に実線で示すように、延長部94が弾性的に撓むため、さらにレバー52を回動可能と

なる。そして、レバー５２が略水平になると、図１２（Ｃ）に示すように、係合突起９６が係合突起９８の奥まで入り込んで延長部９４が弾性的に復元し、係合面９６Ｆ、９８Ｆが係合する。この状態では、レバー５２を矢印Ｌ２方向へ回転させようとしても、係合面９６Ｆが係合面９８Ｆに接触するため回転の抵抗となる。これに抗して、レバー５２を矢印Ｌ２方向へ回転させると、係合面９６Ｆ、９８Ｆの係合によって、インクジェット記録ヘッド１６が斜め上方への力を受ける。そして、図１１に示すように、収容部４４内の所定位置から、基準面８８Ｓの近傍位置を略回転中心として回転し、ユーザーが容易に取り出し可能な位置までせり出す。

【００４６】次に、本実施形態においてインクジェット記録ヘッド１６をキャリッジ１８に装填する方法と、キャリッジ装置１４及びインクジェット記録装置１２の作用を説明する。

【００４７】インクジェット記録ヘッド１６をキャリッジ１８に装填する場合、まず、図７に示すように、レバー５２を矢印Ｌ２方向に回転させて収容部４４の上方を開放した状態で、収容部４４に対応するインクジェット記録ヘッド１６を置く。このとき、収容部４４内の所定位置までインクジェット記録ヘッド１６を押し入れる必要はなく、図７から分かるように、インクジェット記録ヘッド１６が斜めとなる程度に載せ置くだけでよい。

【００４８】次に、レバー５２を矢印Ｌ１方向に回転させる。図８に示すように、カム６２の突起７６がインクジェット記録ヘッド１６の上面１６Ｕに接触し、突起７６は上面１６Ｕを摺動しつつ、インクジェット記録ヘッド１６を下方へと押圧する。回転途中で、図１２（Ｂ）に示すように、係合突起９６、９８のテーパ面９６Ｔ、９８Ｔどうしが接触するため回転に抵抗が生じるが、レバー５２の側壁６０（延長部９４）が撓むので、図９に示すように、さらにインクジェット記録ヘッド１６を収容部４４の所定位置へと押圧しつつ、レバー５２を回転させることができる。

【００４９】図１０に示すように、レバー５２が略水平になると、カム６２の突起７６に形成された位置決め傾斜面７６Ｄと、インクジェット記録ヘッド１６の突起７８に形成された基準傾斜面７８Ｄとが面接触し、圧縮コイルばね７４の弾性力が、＋Ｘ方向、－Ｙ方向及び－Ｚ方向へと作用する。また、サブインクタンク部４０の底面が基準突起８０の基準面８０Ｓに、サブインクタンク部４０の後面が基準突起８４の基準面８４Ｓにそれぞれ接触し、さらに、サブインクタンク部４０の側面の基準突起８６の基準面８６Ｓが壁４２に接触する。これらにより、インクジェット記録ヘッド１６が主走査方向、副走査方向及び上下方向のいずれの方向にも正確に位置決めされて固定される。

【００５０】また、コネクタ９０のピン９２がインクジェット記録ヘッド１６に接続されると、ピン９２からの

弾性力により、インクジェット記録ヘッド１６が、基準面８８Ｓに接触して、副走査方向に位置決めされ固定される。

【００５１】さらに、板ばね５８がインクジェット記録ヘッド１６のヘッド部３８に側方から接触して押圧するので、ヘッド部３８が位置決め突起５６に接触し、インクジェット記録ヘッド１６はその下部においても、主走査方向に位置決めされる。これらにより、インクジェット記録ヘッド１６が収容部４４内において所定位置に正確に位置決めされた状態で、強固に固定されることになる。

【００５２】しかも、インクジェット記録ヘッド１６をキャリッジ１６に位置決めして固定する動作の最終段階で、板ばね５８の弾性力が作用するので、装填作業が容易になる。

【００５３】また、レバー５２が略水平になった状態では、図１２（Ｃ）に示すように、係合突起９６、９８の係合面９６Ｆ、９８Ｆが係合するので、不用意にレバー５２が矢印Ｌ２方向に回転することはなくなる。さらに、この状態では、圧縮コイルばね７４の弾性力を受けて、レバー５２が矢印Ｌ１方向に付勢されている。これによっても、レバー５２の矢印Ｌ２方向への不用意な回転が制限される。

【００５４】このようにして、簡単な操作（実質的に、レバー５２を回転させるのみ）により、キャリッジ１８に対しインクジェット記録ヘッド１６を正確に位置決めして固定し、本発明のキャリッジ装置１４を構成することができる。図１に示すように、キャリッジ装置１４が搭載されたインクジェット記録ヘッド１６を使用して記録媒体２２に画像を記録する場合には、各色のインクジェット記録ヘッド１６が所定位置で正確に位置決めされていることになるので、いわゆる色ずれ等が発生せず、高画質の画像を記録することができる。また、それぞれのインクジェット記録ヘッド１６はキャリッジ１８に対して強固に固定されるため、例えば、いわゆるスループット向上等のためにキャリッジ１８の移動速度を高めたり、加速度を向上させたりした場合でも、インクジェット記録ヘッド１６がキャリッジ１８に対して不用意に位置ずれすることはない。

【００５５】インクジェット記録装置１２の使用により、インクジェット記録ヘッド１６を交換する必要がある場合がある。この場合には、交換するインクジェット記録ヘッド１６に対応するレバー５２を矢印Ｌ２方向に回転させると、係合面９６Ｆ、９８Ｆの係合によって、インクジェット記録ヘッド１６が斜め上方への力を受け、収容部４４内の所定位置から、基準面８８Ｓの近傍位置を略回転中心として回転し、ユーザーが容易に取り出し可能な位置までせり出す。従って、交換すべきインクジェット記録ヘッド１６を容易に取り出すことができ、交換作業が容易になる。

【0056】また、レバー52は、4つのインクジェット記録ヘッド16ごとに設けられ、それぞれ独立して回転させることができる。このため、例えば主走査方向中間に位置するインクジェット記録ヘッド16を交換する場合に、対応するレバー52のみを矢印L2方向へ回転させれば、交換すべきインクジェット記録ヘッド16のみが、他のインクジェット記録ヘッド16から斜め上方に突出するので、中間のインクジェット記録ヘッド16の交換であっても容易に行うことができる。特に、近年ではインクジェット記録ヘッド16が小型化されていたり、互いに密着して配置されていたりする構成のものがあるが、このような構成であっても、特定のインクジェット記録ヘッド16を容易に取り出すことができる。もちろん、インクジェット記録ヘッド16が4つの構成だけでなく、3つあるいは5つ以上の構成でも、中間に位置するインクジェット記録ヘッド16の交換が容易になる。

【0057】なお、上記説明では、インクジェット記録ヘッド16がヘッド部38とサブインクタンク部40とを有する構成ものを例として挙げたが、インクジェット記録ヘッド16としては、サブインクタンク部40を有している必要はなく、ヘッド部38のみで構成されているものであってもよい。

【0058】

【発明の効果】本発明では、上記構成としたので、インクジェット記録ヘッドをキャリッジに対して容易に位置決めして固定できる。

【図面の簡単な説明】

【図1】 本発明の一実施形態のインクジェット記録装置の概略構成を示す側面図である。

【図2】 本発明の一実施形態のキャリッジ装置を一部のインクジェット記録ヘッドをキャリッジから取り出した状態で示す斜視図である。

【図3】 本発明の一実施形態のキャリッジ装置を一部のインクジェット記録ヘッドをキャリッジから取り出した状態で示す斜視図である。

【図4】 本発明の一実施形態のキャリッジ装置を一部のインクジェット記録ヘッドをキャリッジから取り出した状態で示す斜視図である。

【図5】 本発明の一実施形態のキャリッジ装置を一部のインクジェット記録ヘッドをキャリッジから取り出し

た状態で示す斜視図である。

【図6】 本発明の一実施形態のキャリッジ装置を一部のインクジェット記録ヘッドをキャリッジから取り出した状態で示す平面図である。

【図7】 本発明の一実施形態のキャリッジ装置においてキャリッジにインクジェット記録ヘッドを装填する状態を示す一部破断側面図である。

【図8】 本発明の一実施形態のキャリッジ装置においてキャリッジにインクジェット記録ヘッドを装填する状態を示す一部破断側面図である。

【図9】 本発明の一実施形態のキャリッジ装置においてキャリッジにインクジェット記録ヘッドを装填する状態を示す一部破断側面図である。

【図10】 本発明の一実施形態のキャリッジ装置においてキャリッジにインクジェット記録ヘッドを装填した状態を示す一部破断側面図である。

【図11】 本発明の一実施形態のキャリッジ装置においてキャリッジからインクジェット記録ヘッドを取り出す状態を示す一部破断側面図である。

【図12】 本発明の一実施形態のキャリッジ装置において係合突起どうしが係合する状態を(A)から(C)へと順に示す説明図である。

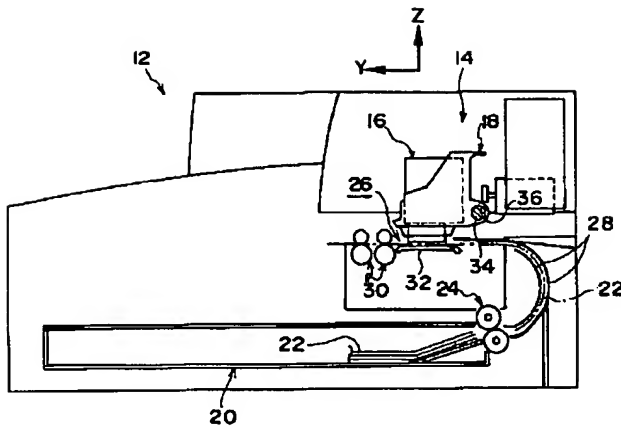
【図13】 従来のキャリッジを示す斜視図である。

【図14】 従来のキャリッジを示す斜視図である。

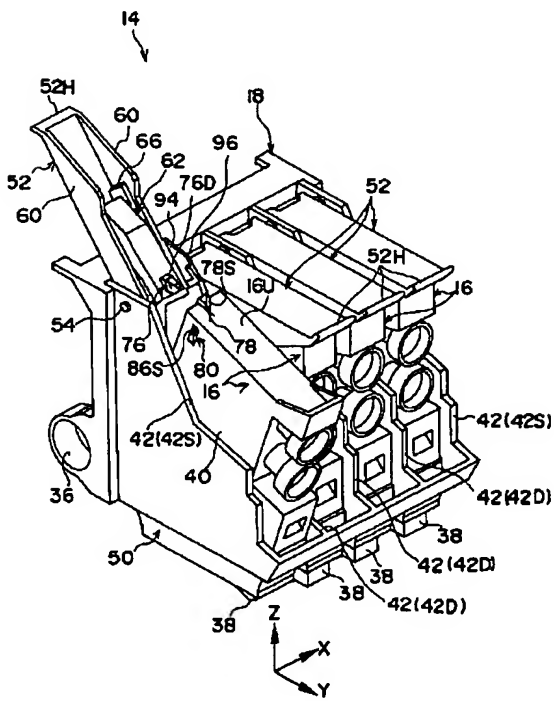
【符号の説明】

- 12 インクジェット記録装置
- 14 キャリッジ装置
- 16 インクジェット記録ヘッド(記録ヘッドユニット)
- 18 キャリッジ
- 44 収容部
- 52 レバー(回動部材、固定部材)
- 56 位置決め突起(基準部材)
- 58 板ばね(付勢部材)
- 62 カム(回動部材、固定部材)
- 80 基準突起(基準部材)
- 84 基準突起(基準部材)
- 86 基準突起(基準部材)
- 88 基準突起(基準部材)
- 92 ピン(付勢部材)
- 96 係合突起(係合部)

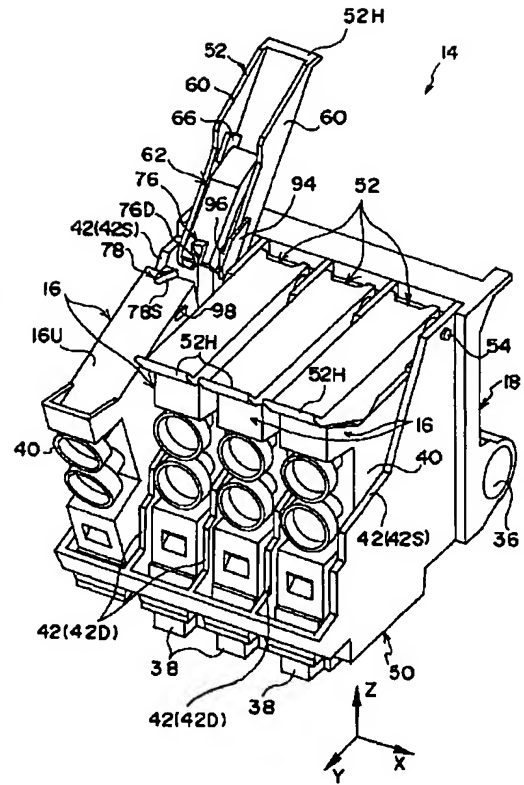
【図1】



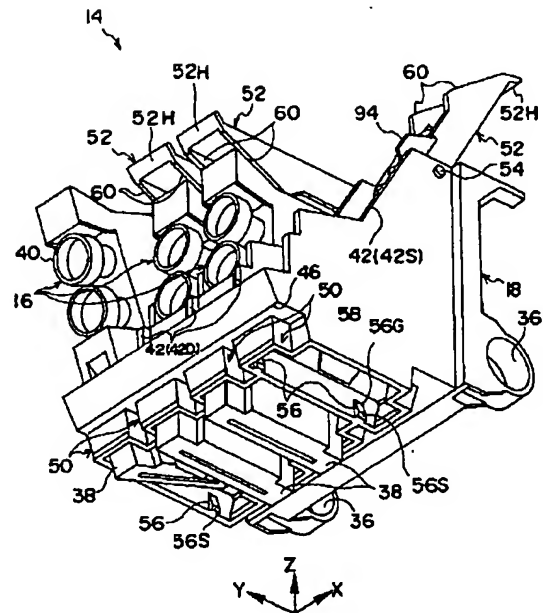
【図2】



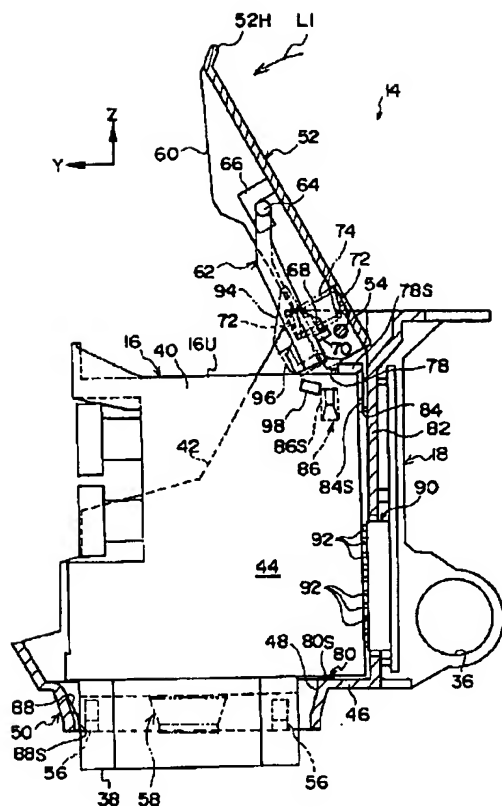
【図3】



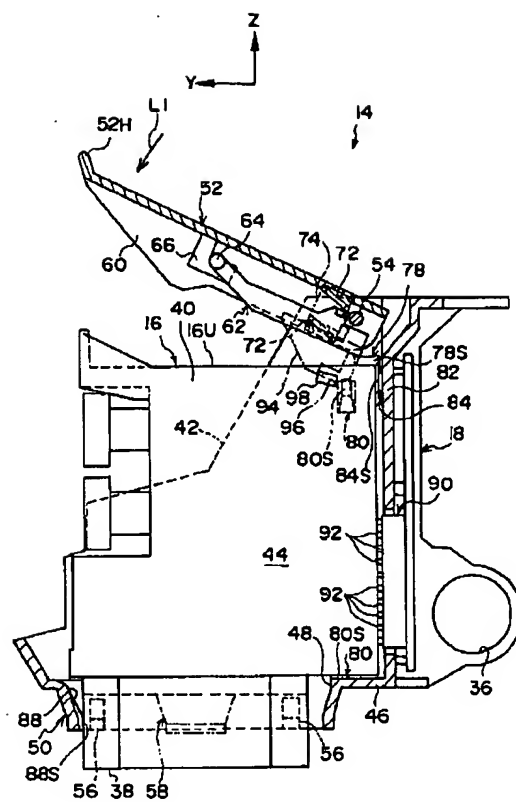
【図5】



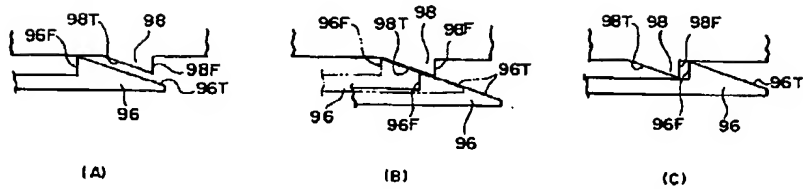
【図8】



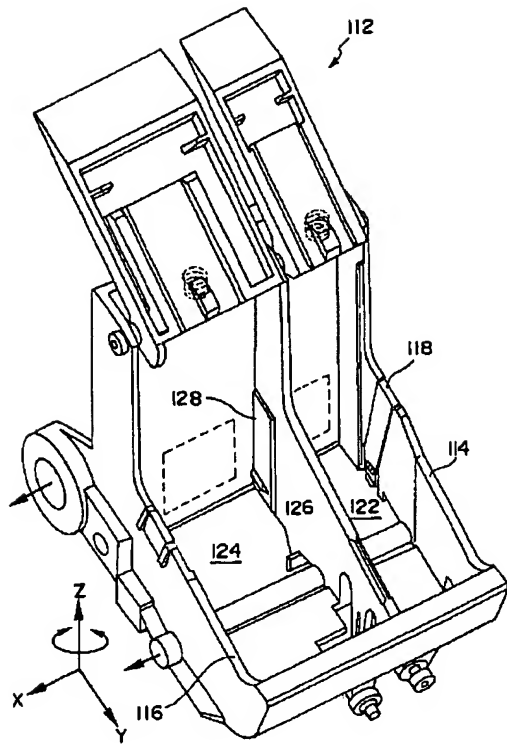
【図9】



【図12】



【図13】



【図14】

